



**U.S. Geological Survey  
Technical Reports on  
Water Resources  
of Pennsylvania**

## U.S. Geological Survey Water-Supply Papers

- WSP 106.** Water resources of the Philadelphia district, by Florence Bascom. 1904.
- WSP 108.** Quality of water in the Susquehanna River drainage basin, by M.O. Leighton, with an introductory chapter on Physiographic features, by G.B. Hollister. 1904.
- WSP 109.** Hydrography of the Susquehanna River drainage basin, by J.C. Hoyt and R.H. Anderson. 1905.
- WSP 161.** Quality of water in the upper Ohio River basin and at Erie, Pennsylvania, by S.J. Lewis. 1906.
- WSP 799.** The floods of March 1936--Part 2, Hudson River to Susquehanna River region. 1937 (1938).
- WSP 800.** The floods of March 1936--Part 3, Potomac, James and upper Ohio River; with a section on the Weather associated with the floods of March 1936, by Stephen Lichtblau. 1937 (1938).
- WSP 915.** Major winter and nonwinter floods in selected basins in New York and Pennsylvania, by W.B. Langbein and others. 1947.
- WSP 1134-B.** Floods of July 18, 1942, in north-central Pennsylvania, by W.S. Eisenlohr, Jr., with a section on Descriptive details of the storm and floods, by J.E. Stewart. 1952, p. 59-158.
- WSP 1420.** Floods of August-October 1955, New England to North Carolina, by D.B. Bogart. 1960.
- WSP 1473.** Study and interpretation of the chemical characteristics of natural water, by J.D. Hem. 1970.
- WSP 1526.** Hydraulic and hydrologic aspects of flood-plain planning, by S.W. Wiitala, K.R. Jetter, and A.J. Somerville. 1961.
- WSP 1532-C.** Effects of agricultural conservation practices on the hydrology of Corey Creek Basin, Pennsylvania, 1954-60, by B.L. Jones. 1966.
- WSP 1532-E.** Hydrology and sedimentation of Corey Creek and Elk Run Basins, northcentral Pennsylvania, by L.A. Reed. 1971.
- WSP 1532-F.** Appraisal of stream sedimentation in the Susquehanna River Basin, by K.F. Williams and L.A. Reed. 1972.
- WSP 1532-H.** Sediment transport by streams draining into the Delaware Estuary, by L.J. Mansue and A.B. Comings. 1974.
- WSP 1535-P.** Chemical composition of atmospheric precipitation in the northeastern United States, by F.J. Pearson, Jr., and D.W. Fisher. 1971.
- WSP 1539-H.** Ground-water resources of Olmsted Air Force Base, Middletown, Pennsylvania, by Harold Meisler and S.M. Longwill. 1961.
- WSP 1586-B.** Salinity of the Delaware Estuary, by Bernard Cohen and L.T. McCarthy, Jr. 1962.
- WSP 1586-G.** Fresh-water discharge--salinity relations in the tidal Delaware River, by W.B. Keighton. 1966.
- WSP 1619-W.** Chemical quality of surface waters in Pennsylvania, by C.N. Durfor and P.W. Anderson. 1963.
- WSP 1779-B.** Variations in the chemical character of the Susquehanna River at Harrisburg, Pennsylvania, by P.W. Anderson. 1963.
- WSP 1779-C.** Chemical quality of surface water in the West Branch Susquehanna River Basin, Pennsylvania, by E.F. McCarren. 1964.
- WSP 1779-X.** Quality of Delaware River water at Trenton, New Jersey, by L.T. McCarthy, Jr., and W.B. Keighton. 1964.
- WSP 1798-M.** Sediment characteristics of five streams near Harrisburg, Pennsylvania, before highway construction, by L.A. Reed. 1976.
- WSP 1798-N.** Hydrology and sedimentation of Bixler Run Basin, central Pennsylvania, by L.A. Reed. 1976.
- WSP 1800.** The role of ground water in the national water situation, by C.L. McGuinness. 1963.
- WSP 1809-O.** Delaware River water quality, Bristol to Marcus Hook, Pennsylvania, August 1949 to December 1963, by W.B. Keighton. 1965.
- WSP 1812.** Public water supplies of the 100 largest cities in the United States, 1962, by C.N. Durfor and Edith Becker. 1964.

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- WSP 1829.** Swatara Creek Basin of southeastern Pennsylvania--An evaluation of its hydrologic system, by W.T. Stuart, W.J. Schneider, and J.W. Crooks. 1967.
- WSP 1835.** Chemical quality of surface water in the Allegheny River Basin, Pennsylvania and New York, by E.F. McCarren. 1967.
- WSP 1871.** Water data for metropolitan areas, compiled by W.J. Schneider. 1968.
- WSP 1879-H.** Water quality and discharge of streams in the Lehigh River Basin, Pennsylvania, by E.F. McCarren and W.B. Keighton. 1969.
- WSP 1899-I.** Streamflow from the United States into the Atlantic Ocean during 1931-60, by C.D. Bue. 1970.
- WSP 1990.** Annotated bibliography on artificial recharge of ground water, 1955-67, by D.C. Signor, D.J. Growitz, and William Kam. 1970.
- WSP 1990-O.** Water quality of streams in the Neshaminy Creek Basin, Pennsylvania, by E.F. McCarren. 1972.
- WSP 2020.** Subsurface waste disposal by means of wells--A selective annotated bibliography, by D.R. Rima, E.B. Chase, and B.M. Myers. 1971.
- WSP 2035.** Geohydrologic reconnaissance of the upper Potomac River Basin, by F.W. Trainer and F.A. Watkins, Jr. 1975.
- WSP 2042.** Mean annual runoff in the Upper Ohio River Basin, 1941-70, and its historical variation, by R.M. Beall. 1978.
- WSP 2054.** Effectiveness of sediment-control techniques used during highway construction in central Pennsylvania, by L.A. Reed. 1978.
- WSP 2072.** Suspended-sediment discharge, in five streams near Harrisburg, Pennsylvania, before, during, and after highway construction, by L.A. Reed. 1980.
- WSP 2250.** National water summary 1983; hydrologic events and issues. 1984.
- WSP 2256-A.** Distribution and transport of trace substances in the Schuylkill River Basin from Berne to Philadelphia, Pennsylvania, by J.K. Stamer, T.H. Yorke, and G.L. Pederson. 1985. (Supersedes Open-file report 83-265.)
- WSP 2256-B.** Effects of low-level dams on the distribution of sediment, trace metals, and organic substances in the lower Schuylkill River Basin, Pennsylvania, by T.H. Yorke, J.K. Stamer, and G.L. Pederson, 1985.
- WSP 2262.** Organochlorine pesticide and polychlorinated biphenyl residues at four trophic levels in the Schuylkill River, Pennsylvania: *in* Selected Papers in the Hydrologic Sciences, by J.L. Barker. 1984.
- WSP 2275.** National water summary 1984; hydrologic events, selected water-quality trends, and ground-water resources. 1985.
- WSP 2276.** Techniques for estimating streamflow characteristics in the Eastern and Interior coal provinces of the United States, by K.L. Wetzel and J.M. Bettendorff. 1986.
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- WSP 2325.** National water summary 1986; hydrologic events and ground-water quality. 1988.
- WSP 2284.** Evaluation of the ground-water resources of the Lower Susquehanna River Basin, Pennsylvania and Maryland, by J.M. Gerhart and G.J. Lazorchick. 1988.
- WSP 2346.** Geohydrology and ground-water resources of Philadelphia, Pennsylvania, by G.N. Paulachok. 1991.
- WSP 2350.** National water summary 1987; hydrologic events and water supply and use. 1990.
- WSP 2375.** National water summary 1988-89; hydrologic events and floods and droughts. 1991.
- WSP 2425.** National water summary on wetland resources—selected articles: STATE SUMMARIES.
- WSP 2493.** Evaluation of agricultural best-management practices in the Conestoga River Headwaters, Pennsylvania: A summary report, 1982-90, by P.L. Lietman. 1997.

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- PP 271.** The natural channel of Brandywine Creek, Pennsylvania, by M.G. Wolman. 1955.
- PP 282-F.** Drainage basins, channels, and flow characteristics of selected streams in central Pennsylvania, by L.M. Brush, Jr. 1961.
- PP 381.** Water resources of the Delaware River Basin, by G.G. Parker, A.G. Hely, W.B. Keighton, F.H. Olmsted, and others. 1964 (1965).
- PP 417-A.** Relation between ground water and surface water in Brandywine Creek Basin, Pennsylvania, by F.H. Olmsted and A.G. Hely. 1962.
- PP 417-B.** Some relations between streamflow characteristics and the environment in the Delaware River region, by A.G. Hely and F.H. Olmsted. 1963.
- PP 473-B.** Field investigation of mine waters in the Northern Anthracite field, Pennsylvania, by Ivan Barnes, W.T. Stuart, and D.W. Fisher. 1964.
- PP 575-C.** Geological Survey Research 1967. Contains the following articles, which are not available separately. The construction and use of flow-volume curves, by E.G. Miller. Hydrogeologic significance of calcium-magnesium ratios in ground water from carbonate rocks in the Lancaster quadrangle, southeastern Pennsylvania, by Harold Meisler and A.E. Becher.
- PP 700-B.** Geological Survey Research 1970. Contains the following article, which is not available separately. High-calcium limestone deposits in Lancaster County, southeastern Pennsylvania, by A.E. Becher and Harold Meisler.
- PP 701-A.** Hydrology of two small river basins in Pennsylvania before urbanization, by R.A. Miller, John Troxell, and L.B. Leopold with a section on Observations of stream fauna, by Ruth Patrick and R.R. Grant, Jr. 1971 (1972).
- PP 750-D.** Geological Survey Research 1971. Contains the following article, which is not available separately. Relationship between ground-water levels and quality in shallow observation wells in Muddy Creek Basin, southeastern York County, Pennsylvania, by D.J. Growitz and O.B. Lloyd, Jr.
- PP 800-C.** Geological Survey Research 1972. Contains the following article, which is not available separately. An evaluation of the use of herbicides to control aquatic weeds in six Pennsylvania recreation lakes, by J.L. Barker.
- PP 813-I.** Summary appraisals of the Nation's ground-water resources - Mid-Atlantic region, by Allen Sinnott and E.M. Cushing. 1978.
- PP 813-J.** Summary appraisals of the Nation's ground-water resources - Great Lakes region, by W.E. Weist, Jr. 1978
- PP 924.** Hurricane Agnes rainfall and floods, June-July 1972, by J.F. Bailey, J.L. Patterson, and J.L.H. Paulhus. 1975.
- PP 1191.** Storm-induced debris avalanching and related phenomena in the Johnstown area, Pennsylvania, with references to other studies in the Appalachians, by J.S. Pomeroy. 1980 (1981).
- PP 1211.** Johnstown-western Pennsylvania storms and floods of July 19-20, 1977, by L.R. Hoxit, R.A. Maddox, and C.F. Chappell, National Oceanic and Atmospheric Administration, and S.A. Brua, U.S. Geological Survey. 1982.
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- 1331-A.** Mississippian stratigraphy of northeastern Pennsylvania, by G.R. Schiner and G.E. Kimmel. 1972.

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- C-104.** Water resources of southeastern Bucks County, Pennsylvania, by J.B. Graham, J.W. Mangan, and W.E. White, Jr. 1951.
- C-174.** Water resources of the Lake Erie shore region in Pennsylvania, by J.W. Mangan, D.W. Van Tuyl, and W.F. White, Jr. 1952.
- C-204.** Floods in Youghiogheny and Kiskiminetas River Basins, Pennsylvania and Maryland, frequency and magnitude. 1952.
- C-257.** The use of water in Pennsylvania, 1951, by J.W. Mangan and J.B. Graham. 1953.
- C-315.** Water resources of the Pittsburgh area, Pennsylvania, by Max Noecker, D.W. Greenman, and N.H. Beamer. 1954.
- C-377.** Floods of August 1955 in the northeastern States. 1956. (See Water-Supply Paper 1420.)
- C-439.** Time and travel of water in the Ohio River, Pittsburgh to Cincinnati, by R.E. Steacy. 1961.
- C-526.** Stream quality in Appalachia as related to coal-mine drainage, 1965, by J.E. Biesecker and J.R. George. 1966.
- C-554.** Hydrology for urban land planning--A guidebook on the hydrologic effects of urban land use, by L.B. Leopold. 1968.
- C-601-A.** Water for the cities--The outlook, by W.J. Schneider and A.M. Spieker. 1969 (1970).
- C-601-D.** Water as an urban resource and nuisance, by H.E. Thomas and W.J. Schneider. 1970.
- C-601-E.** Sediment problems in urban areas, by H.P. Guy. 1970.
- C-601-F.** Hydrologic implications of solid-waste disposal, by W.J. Schneider. 1970.
- C-601-G.** Real-estate lakes, by D.A. Rickert and A.M. Spieker. 1971 (1972).
- C-601-H.** Role of water in urban planning and management, by W.J. Schneider, D.A. Rickert, and A.M. Spieker. 1973.
- C-601-I.** Water facts and figures for planners and managers, by J.H. Feth. 1973.
- C-601-J.** Extent and development of urban flood plains, by W.J. Schneider and J.E. Goddard. 1974.
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- C-645.** A procedure for evaluating environmental impact, by L.B. Leopold, F.E. Clark, B.B. Hanshaw, and J.R. Balsley. 1971.
- C-670.** Fluvial-sediment discharge to the ocean from the conterminous United States, by W.F. Curtis, J.K. Culbertson, and E.B. Chase. 1973.
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- C-686.** Large rivers of the United States, by K.T. Iseri and W.B. Langbein. 1974.
- C-703.** Water demands for expanding energy development, by G.H. Davis and L.A. Wood. 1974.
- C-719.** The National Stream Quality Accounting Network (NASQAN)--Some questions and answers, by J.F. Ficke and R.O. Hawkinson. 1975.
- C-728.** Landsliding in Allegheny County, Pennsylvania, by R.P. Briggs, J.S. Pomeroy, and W.E. Davies. 1975.
- C-745.** Water consumption by nuclear power plants and some hydrological implications, by E.V. Giusti and E.I. Meyer. 1977 (1978).
- C-747.** Environmental geology, Allegheny County and vicinity, Pennsylvania--Description of a program and its results, by R.P. Briggs. 1977.
- C-779.** Geologic disposal of high-level radioactive wastes--Earth-science perspectives, by J.D. Bredehoeft, A.W. England, D.B. Stewart, N.J. Trask, and I.J. Winograd. 1978.
- C-832.** Estimating the costs of landslide damage in the United States, by R.W. Fleming and F.A. Taylor. 1980.

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**Armbruster, J.T.**, 1976, An infiltration index useful in estimating low flows of drainage basins: v. 4, p. 533-538.

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- HA-61.** Stream composition of the conterminous United States, by F.H. Rainwater. 1962.
- HA-194.** Generalized maps showing annual runoff and productive aquifers in the conterminous United States, compiled by C.L. McGuinness. 1964.
- HA-198.** Water resources of the Appalachian region, Pennsylvania to Alabama, by W.J. Schneider and others. 1965.
- HA-199.** Preliminary map of the conterminous United States showing depth to and quality of shallowest ground water containing more than 1,000 parts per million dissolved solids, by J.H. Feth and others. 1965.
- HA-200.** Chemical quality of public water supplies of the United States and Puerto Rico, 1962, by C.N. Durfor and Edith Becker. 1964.
- HA-212.** Annual runoff in the conterminous United States, by J.F. Blakey. 1966.
- HA-246.** Floods at Easton, Pennsylvania - Phillipsburg, New Jersey, by G.M. Farlekas. 1967.
- HA-248.** Floods on the Schuylkill River from Conshohocken to Philadelphia, Pennsylvania, by A.T. Alter. 1967.
- HA-295.** Ground-water resources of the Appalachian Region, by G.G. Wyrick. 1968.
- HA-335.** Water quality in the Delaware Estuary for the two years of drought, 1965-1966, from Trenton, New Jersey, to Reedy Island, Delaware, by W.B. Keighton. 1969.
- HA-483.** Extent and frequency of floods on the Schuylkill River near Norristown, Pennsylvania, by W.F. Busch and L.C. Shaw. 1973.
- HA-523.** Flood of June 1972 in the Wilkes-Barre area, Pennsylvania, by H.N. Flippo and L.W. Lenfest, Jr. 1973.
- HA-530.** Flood of June 1972 in the Harrisburg area, Pennsylvania, by L.V. Page and L.C. Shaw. 1974.
- HA-541.** Flood of June 22-23, 1972, at Lock Haven, Pennsylvania, by H.N. Flippo, Jr. 1975.
- HA-676.** Water-table map of Philadelphia, Pennsylvania, 1976-1980, by G.N. Paulachok and C.R. Wood. 1984.
- HA-697.** Distribution of bottom sediments and effects of proposed dredging in the ship channel of the Delaware River between northeast Philadelphia, Pennsylvania and Wilmington, Delaware, 1984, by P.B. Duran. 1986.
- HA-705.** Distribution of water-quality characteristics that may indicate the presence of acid mine drainage in the eastern coal province of the United States, by K.L. Wetzel and S.A. Hoffman. 1989.
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- WRI 76-57.** Preimpoundment water quality of Raystown Branch Juniata River and six tributary streams, south-central Pennsylvania, by D.R. Williams. 1976. (ADA-027 387)
- WRI 76-66.** Preliminary results of preimpoundment water-quality studies in the Tioga River Basin, Pennsylvania and New York, by J.R. Ward. 1976. (ADA-029 315)
- WRI 76-84.** Limnological survey of Sacony Creek Basin, Berks County, Pennsylvania, by J.L. Barker and K.P. Kulp. 1976. (PB-257 270/AS)
- WRI 76-111.** Sediment discharge from an area of highway construction, Applemans Run Basin, Columbia County, Pennsylvania, by D.A.V. Eckhardt. 1976 (1977). (PB-263 616/AS)
- WRI 77-12.** Flow routing in the Susquehanna River Basin: Part I, effects of Raystown Lake on the low-flow frequency characteristics of the Juniata and lower Susquehanna Rivers, Pennsylvania, by J.T. Armbruster. 1977. (PB-268 981/AS)
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- WRI/OF 77-67.** Ground-water resources of Chester County, Pennsylvania, by L.J. McGreevy and R.A. Sloto.
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- WRI 78-35.** Sediment discharge from highway construction near Port Carbon, Pennsylvania, by R.E. Helm. 1978. (PB-280 793)
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- WRI 79-3.** Regional stochastic generation of streamflows using an arima (1,0,1) process and disaggregation, by J.T. Armbruster. 1979. (PB-300 945/AS)
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- WRI 80-53.** Effects of strip mining the abandoned deep Anna S mine on the hydrology of Babb Creek, Tioga County, Pennsylvania, by L.A. Reed. 1980. (PB-81 121 337)
- WRI 80-68.** The effects of highway construction on sediment discharge into Blockhouse Creek and Steam Valley Run, Pennsylvania, by R.A. Hainly. 1981. (PB-81 202 202)

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- WRI 81-1.** Preimpoundment water quality in the Tioga River Basin, Pennsylvania, and New York, by J.R. Ward. 1981. (ADA-101 909)
- WRI 81-69.** Sedimentation in the East Branch Mahoning Creek, Clearfield and Jefferson Counties, Pennsylvania, June 1979 to June 1980, by K.L. Wetzel.
- WRI/OF 81-70** Water resources of the Clarion River and Redbank Creek Basins, northwestern Pennsylvania, by T.F. Buckwalter, C. H. Dodge, G.R. Schiner, and H.E. Koester.
- WRI 81-73.** A stormwater management model for the West Branch Brandywine Creek, Chester County, Pennsylvania, by R.A. Sloto.
- WRI/OF 81-537.** Hydrology of Area 3, Eastern Coal Province, Pennsylvania, by W.J. Herb, L.C. Shaw, and D.E. Brown.
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- WRI 82-21.** Evaluation of the streamflow data program in Pennsylvania, by H.N. Flippo, Jr.
- WRI/OF 83-223.** Hydrology of Area 1, Eastern Coal Province, Pennsylvania, by W.J. Herb, D.E. Brown, L.C. Shaw, and A.E. Becher.
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- WRI 82-4020.** Effect of urbanization on the water resources of Warminster Township, Bucks County, Pennsylvania, by R.A. Sloto and D.K. Davis.
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- WRIR 83-4032.** Water-quality assessment of Francis E. Walter Reservoir, Luzerne and Carbon Counties, Pennsylvania, by J.L. Barker.
- WRIR 83-4113.** Effects of specific land uses on nonpoint sources of suspended sediment, nutrients, and herbicides - Pequea Creek Basin, Pennsylvania, 1979-80, by P.L. Lietman, J.R. Ward, and T.E. Behrendt.
- WRIR 83-4164.** Water-quality and chemical loads of the Susquehanna River at Harrisburg, Pennsylvania, April 1980 to March 1981, by D.K. Fishel.
- WRIR 83-4216.** Calculating sediment discharge from a highway construction site in central Pennsylvania, by L.A. Reed, J.R. Ward, and K.L. Wetzel.
- WRIR 83-4274.** Reconnaissance of mine drainage in the coal fields of eastern Pennsylvania, by D.J. Growitz, L.A. Reed, and M.M. Beard.
- WRIR 84-4189.** Temperature of ground water at Philadelphia, Pennsylvania, 1979-1981, by G.N. Paulachok.
- WRIR 84-4223.** Trap efficiency of a sediment-control pond below a block-cut coal mine in Fayette County, Pennsylvania, by L.A. Reed, L. DiLissio, and D.E. Stump, Jr.
- WRIR 84-4327.** Evaluation of the ground-water resources of parts of Lancaster and Berks Counties, Pennsylvania, by J.M. Gerhart and G.J. Lazorchick.
- WRIR 84-4335.** Estimating iron and aluminum content of acid mine discharge from a northcentral Pennsylvania coal field by use of acidity titration curves, by A.N. Ott.
- WRIR 84-4362.** Effects of surface mining on streamflow, suspended sediment, and water quality in the Stony Fork drainage basin, Fayette County, Pennsylvania, by D.E. Stump, Jr. and T.M. Mastrilli.
- WRIR 85-4008.** Statistical analyses of flood frequency, low-flow frequency, and flow duration of streams in the Philadelphia area, Pennsylvania, by A. Voytik.
- WRIR 85-4023.** Results of a preimpoundment water-quality study of Swatara Creek, Pennsylvania, by D.K. Fishel and J.E. Richardson.
- WRIR 85-4025.** Areal and temporal variability of selected water quality characteristics in two hydrologic-benchmark basins in the northeastern United States, by R.A. Hainly and J.R. Ritter.

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- WRIR 85-4038.** Quality of water in mines in the western middle coal field, anthracite region, eastcentral Pennsylvania, by L.A. Reed, M.M. Beard, and D.J. Growitz.
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- WRIR 85-4177.** Determination of benthic-invertebrate indices and water-quality trends of selected streams in Chester County, Pennsylvania, 1969-80, by C.R. Moore.
- WRIR 85-4185.** Simulation of ground-water flow in aquifers along the Susquehanna River in Columbia County, Pennsylvania, by J.H. Williams and G.E. Senko.
- WRIR 85-4202.** Occurrence of nitrate and herbicides in ground water in the upper Conestoga River Basin, Pennsylvania, by D.K. Fishel and P.L. Lietman.
- WRIR 85-4213.** Sediment loads, discharges, and yields in the East Branch Mahoning Creek Basin, Clearfield and Jefferson Counties, Pennsylvania, by C.A. Loper and K.L. Wetzel.
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- WRIR 85-4250.** Surface-water quality in Pequea Creek Basin, Pennsylvania, by J.R. Ward.
- WRIR 85-4283.** An appraisal of areal and temporal variability from 1962 to 1982 in hydrologic accounting unit 020502, by R.A. Hainly, J.F. Truhlar, and K.L. Wetzel.
- WRIR 85-4331.** Low-flow routing in the Lehigh and Delaware Rivers, Pennsylvania, by H.N. Flippo, Jr.
- WRIR 85-4341.** Ground-water levels in the Cockeysville marble of southern Chester County, Pennsylvania, 1983-84, by D.W. Speight.
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- WRIR 86-4195.** Technique for estimating depths of 100-year floods in Pennsylvania, by H.N. Flippo, Jr.
- WRIR 86-4352.** Ground-water levels in the lower Paleozoic and Precambrian crystalline rocks, southeastern Chester County, Pennsylvania, July and August 1986, by J.A. Garges.
- WRIR 87-4065.** Water resources of Oley Township, Berks County, Pennsylvania, by G.N. Paulachok and C.R. Wood.
- WRIR 87-4098.** Effect of urbanization on the water resources of eastern Chester County, Pennsylvania, by R.A. Sloto.
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- WRIR 87-4196.** Effects of urbanization on storm runoff volume and peak discharge of Valley Creek, eastern Chester County, Pennsylvania, by R.A. Sloto.
- WRIR 87-4218.** Geohydrology of the Furnace Creek Basin and vicinity, Berks, Lancaster, and Lebanon Counties, Pennsylvania, by L.D. Cecil.

## **Water-Resources Investigations Reports--Continued**

- WRIR 88-4005.** Suspended-sediment yields from an unmined area and from mined areas before and after reclamation in Pennsylvania, June 1978-September 1983, by L.A. Reed and R.A. Hainly.
- WRIR 88-4052.** Ground-water levels in the lower Paleozoic and Precambrian crystalline rocks of East Bradford and West Bradford Townships, Chester County, Pennsylvania, July and August 1987, by J.A. Garges.
- WRIR 88-4087.** Preimpoundment hydrologic conditions in the Swatara Creek (1981-84) and estimated postimpoundment water quality in and downstream from the planned Swatara State Park Reservoir, Lebanon and Schuylkill Counties, Pennsylvania, by D.K. Fishel.
- WRIR 88-4095.** Withdrawals and consumptive use of water in Pennsylvania, 1984, by C.A. Loper, S.D. Lent, and K.L. Wetzel.
- WRIR 88-4211.** Relation of ground-water quality to land use in the Philadelphia, Pennsylvania-Camden, New Jersey area, by R.S. Blickwedel and C.R. Wood.
- WRIR 89-4014.** Water quality of the West Branch Lackawaxen River and limnology of Prompton Lake, Wayne County, Pennsylvania, October 1986 through September 1987, by J.L. Barker.
- WRIR 89-4043.** Altitude and configuration of the potentiometric surface in the Triassic sandstones and shales, northeastern Chester County, Pennsylvania, September 1987 through January 1988, by L.A. Senior and J.A. Garges.
- WRIR 89-4113.** Effects of acidic precipitation on the water quality of streams in the Laurel Hill area, Somerset County, Pennsylvania, 1983-86, by J.L. Barker and E.C. Witt, III.
- WRIR 89-4154.** Geohydrology and water quality in the vicinity of the Gettysburg National Military Park and Eisenhower National Historic Site, Pennsylvania, by A.E. Becher.
- WRIR 89-4169.** Geohydrology and simulation of ground-water flow in the carbonate rocks of the Valley Creek Basin, eastern Chester County, Pennsylvania, by R.A. Sloto.
- WRIR 90-4011.** Water quality of the upper West Branch Susquehanna River and tributary streams between Curwensville and Renono, Pennsylvania, by R.A. Hainly and J.L. Barker.
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- WRIR 90-4131.** Evaluation of agricultural best-management practices in the Conestoga River Headwaters, Pennsylvania: Description and water quality of the Little Conestoga Creek Headwaters prior to the implementation of nutrient management, by D.K. Fishel, M.J. Brown, K.M. Kostelnik, and M.A. Howse.
- WRIR 90-4160.** Base-flow frequency characteristics of selected Pennsylvania streams, by K.E. White and R.A. Sloto.
- WRIR 91-4004.** Altitude and configuration of the water-level surface in the lower Paleozoic and Precambrian crystalline rocks of the Red Clay Creek Basin, Chester County, Pennsylvania, and New Castle County, Delaware, June through October 1989 and March 1990, by K.L. Vogel, W.L. Miller, and B.C. McManus.
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- WRIR 91-4182.** Altitude and configuration of the potentiometric surface in the crystalline and metasedimentary rocks, northeastern Chester County, Pennsylvania, May through October 1990, by B.C. McManus.
- WRIR 92-4088.** Radium and radon in ground water in the Chickies Quartzite, southeastern Pennsylvania, by L.A. Senior and K.L. Vogel.

## **Water-Resources Investigations Reports--Continued**

- WRIR 92-4093.** Simulation of streamflow and sediment transport in two surface-coal-mined basins in Fayette County, Pennsylvania, by J.I. Sams, III and E.C. Witt, III.
- WRIR 92-4183.** Altitude and configuration of the potentiometric surface in Springfield Township, Bucks County, Pennsylvania, April 1991 through October 1991, by C.L. Schreffler.
- WRIR 92-4194.** Altitude and configuration of the potentiometric surfaces of the upper and lower aquifer systems in Bridgeton, Nockamixon, and Tinicum Townships, Bucks County, Pennsylvania, April 1991 through April 1992, by B.C. McManus and C.J. Rowland.
- WRIR 93-4055.** Geohydrology and simulation of ground-water flow in the Red Clay Creek Basin, Chester County, Pennsylvania, and New Castle County, Delaware, by K.L. Vogel and A.G. Reif.
- WRIR 93-4069.** Hydrology and the effects of selected agricultural best-management practices in the Bald Eagle Creek watershed, York County, Pennsylvania, prior to and during nutrient management, by M.J. Langland and D.K. Fishel.
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- WRIR 94-4206.** Evaluation of agricultural best-management practices in the Conestoga River headwaters, Pennsylvania: Effects of pipe-outlet terracing on surface-runoff and ground-water quantity and quality in a small carbonate-rock basin near Churchtown, Pennsylvania, 1983-89, by P.L. Lietman, L.C. Gustafson-Minnich, and D.W. Hall.

## **Water-Resources Investigations Reports--Continued**

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- WRIR 95-4046.** Evaluation of agricultural best-management practices in the Conestoga River headwaters, Pennsylvania: Effects of nutrient management on water quality in the Little Conestoga Creek headwaters 1983-89, by E.H. Koerkle, D.K. Fishel, and M.J. Brown.
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- WRIR 95-4143.** Evaluation of agricultural best-management practices in the Conestoga River Headwaters, Pennsylvania: Effects of nutrient management on quality of surface runoff and ground water at a small carbonate-rock site near Ephrata, Pennsylvania, 1984-90, by D.W. Hall, P.L. Lietman, and E.H. Koerkle.
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## **Water-Resources Investigations Reports--Continued**

- WRIR 96-4133.** Effects of coal-mine discharges on the quality of the Stonycreek River and its tributaries, Somerset and Cambria Counties, Pennsylvania, by D.R. Williams, J.I. Sams, III, and M.E. Mulkerrin.
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- WRIR 96-4286.** Hydrogeologic investigation of the Malvern TCE Superfund Site, Chester County, Pennsylvania, by R.A. Sloto.
- WRIR 96-4288.** Ground-water quality and its relation to hydrogeology, land use, and surface-water quality in the Red Clay Creek Basin, Piedmont Physiographic Province, Pennsylvania and Delaware, by L.A. Senior.
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- WRIR 97-4095.** Results of borehole geophysical logging and aquifer-isolation tests conducted in the John Wagner and Sons, Inc. former production well, Ivyland, Pennsylvania, by R.A. Sloto.
- WRIR 97-4104.** Identification of potential water-bearing zones by the use of borehole geophysics in the vicinity of Keystone Sanitation Superfund Site, Adams County, Pennsylvania and Carroll County, Maryland, by R.W. Conger.
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- WRIR 97-4120.** Metals, pesticides, and semivolatile organic compounds in sediment in Valley Forge National Historical Park, Montgomery County, Pennsylvania, by A.G. Reif.
- WRIR 97-4124.** Herbicide concentrations in and loads transported by the Conestoga River and Pequea Creek, Lancaster County, Pennsylvania, 1992-95, by L.A. Reed, E.H. Koerkle, and C.S. Takita.
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- OFR 76-350.** Map showing selected extreme streamflow statistics and drainage areas, Greater Pittsburgh region, Pennsylvania, by M.B. Coll, Jr., and R.M. Beall.
- OFR 76-352.** Guide to the availability of hydrologic data, greater Pittsburgh region, Pennsylvania, by R.M. Beall.
- OFR 76-445.** Selected hydrologic data, Clarion River and Redbank Creek Basins, northwestern Pennsylvania--An interim report, by H.E. Koester and Joseph Lescinsky.
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- OFR 80-566.** Work plan for the Schuylkill River Basin, Pennsylvania: Assessment of river quality as related to the distribution and transport of trace metals and organic substances, by G.L. Pederson, T.H. Yorke, and J.K. Stamer.
- OFR 80-1119.** Ground-water quality and data on wells and springs in Pennsylvania, Volume I--Ohio and St. Lawrence River Basins, by H.E. Koester and D.R. Miller.
- OFR 81-60.** Sample mine-site permit application (hydrologic assessment), by W.J. Herb, D.M. Brown, L.D. Carswell, and P.L. Lietman.
- OFR 81-329.** Ground-water quality and data on wells and springs in Pennsylvania, Volume II, Susquehanna and Potomac River Basins, by H.E. Koester and D.R. Miller.
- OFR 81-330.** Ground-water quality and data on wells and springs in Pennsylvania, Volume III, Delaware River Basin, by H.E. Koester and D.R. Miller.
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- OFR 81-1115.** An evaluation of water-quality monitoring in the Brandywine Creek Basin, Pennsylvania, 1973-78, by J.J. Murphy, J.R. Ritter, A.E. Brown, and J.P. Chiarella.
- OFR 82-861.** Time-of-travel and dispersion studies, Lehigh River, Francis E. Walter Lake to Easton, Pennsylvania, by C.D. Kauffman, Jr.
- OFR 83-149.** Hydrologic data for aquifers in Philadelphia, Pennsylvania, by G.N. Paulachok, C.R. Wood, and L.J. Norton.
- OFR 84-235.** Water-table contour map of the carbonate rocks of eastern Chester County, Pennsylvania, October 1983, by R.A. Sloto.
- OFR 84-706.** Compilation of ground-water-quality data in Pennsylvania, by J.L. Barker.
- OFR 84-715.** Ground-water levels in the carbonate rocks of central Chester County, Pennsylvania, May 18 to June 15, 1984, by C.R. Wood.
- OFR 85-686.** Physical, chemical, and biological data for selected streams in Chester County, Pennsylvania, 1969-80, by C.R. Moore.
- OFR 86-140.** Water quality data for precipitation and storm runoff in Pennypack Creek Basin, Philadelphia, Pennsylvania, by D.W. Speight.

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- OFR 86-486.** Flood of November 1985 in West Virginia, Pennsylvania, Maryland, and Virginia, by J.B. Lescinsky.
- OFR 87-217.** Selected ground-water data, Chester County, Pennsylvania, by R.A. Sloto.
- OFR 87-232.** Map showing radium concentrations in ground water of the Chickies Formation, southeastern Pennsylvania, 1986-87, by L.D. Cecil.
- OFR 87-475.** Water resources activities of the U.S. Geological Survey in Pennsylvania, 1986-87, by R.E. Helm.
- OFR 88-96.** Evaluation of agricultural best-management practices in the Conestoga River headwaters, Pennsylvania, by D.C. Chichester.
- OFR 88-149.** Water fact sheet, U.S. Geological Survey, Department of the Interior. U.S. Geological Survey ground-water studies in Pennsylvania, by C.R. Wood. 1988.
- OFR 88-470.** Hydrologic data for Indian Creek Basin, Fayette and Westmoreland Counties, Pennsylvania, 1985-87, by J.I. Sams, III and E.C. Witt, III.
- OFR 89-247.** Streamflow and water-quality data for Little Clearfield Creek Basin, Clearfield County, Pennsylvania, December 1987 - November 1988, by K.M. Kostelnik and R.R. Durlin.
- OFR 89-273.** Water-resources activities of the U.S. Geological Survey in Pennsylvania, 1988-89, by R.E. Helm.
- OFR 89-404.** Streamflow and water-quality data for Meadow Run Basin, Fayette County, Pennsylvania, December 1987 - November 1988, by K.M. Kostelnik and E.C. Witt, III.
- OFR 89-577.** Streamflow and water-quality data for Little Scrubgrass Creek Basin, Venango and Butler Counties, Pennsylvania, December 1987 - November 1988, by K.M. Kostelnik and R.R. Durlin.
- OFR 89-584.** Water-resources data for North Fork Bens Creek, Somerset County, Pennsylvania, August 1983 through September 1988, by E.C. Witt, III.
- OFR 90-109.** Ground-water resources of cambrian and ordovician carbonate rocks in the Valley and Ridge physiographic province of Pennsylvania, by A.E. Becher.
- OFR 90-164.** Large springs in the valley and ridge physiographic province of Pennsylvania: A contribution to the Appalachian Valley-Piedmont Regional Aquifer--system analysis study, by D.A. Saad and D.J. Hippe.
- OFR 90-384.** Water-resources data for Indiana County, Pennsylvania, by D.R. Williams and T.A. McElroy.
- OFR 91-168.** Water fact sheet, U.S. Geological Survey, Department of the Interior. National Water-Quality Assessment Program--the lower Susquehanna River Basin, by K.J. Breen, R.A. Hainly, and S.A. Hoffman. 1991.
- OFR 91-214.** Water-resources investigations in Pennsylvania: programs and activities of the U.S. Geological Survey, 1990-91, by L.O. McLanahan.
- OFR 92-165.** Evaluation of nutrient quality-assurance data for Alexanders and Mount Rock Spring Basins, Cumberland County, Pennsylvania, by E.C. Witt, III, D.J. Hippe, and R.M. Giovannitti.
- OFR 92-494.** Guidelines for studies of contaminants in biological tissues for the National Water-Quality Assessment Program, by J.K. Crawford and S.N. Luoma.
- OFR 92-635.** Evaluation of methods for delineating areas that contribute water to wells completed in valley-fill aquifers in Pennsylvania, by D.W. Risser and T.M. Madden, Jr.
- OFR 93-27.** Altitude and configuration of the potentiometric surface in Plumstead Township, Bucks County, Pennsylvania, June 1991 through November 1991, by C.L. Schreffler.
- OFR 93-28.** Altitude and configuration of the potentiometric surface in New Hope Borough and Solebury Township, Bucks County, Pennsylvania, October 1991 through April 1992, by C.L. Schreffler.

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- OFR 93-115.** Water-quality data for two surface coal mines reclaimed with alkaline waste or urban sewage sludge, Clarion County, Pennsylvania, May 1983 through November 1989, by D.L. Dugas, C.A. Cravotta, III, and D.A. Saad.
- OFR 93-152.** Water-resources investigations in Pennsylvania: programs and activities of the U.S. Geological Survey, 1993, compiled by L.O. McLanahan.
- OFR 93-417.** Altitude and configuration of the potentiometric surface, in Buckingham and Wrightstown Townships, Bucks County, Pennsylvania, June 1992 through January 1993, by B.C. McManus, C.L. Schreffler, and C.J. Rowland-Lesitsky.
- OFR 93-659.** Altitude and configuration of the potentiometric surface, May and June 1993, and change in water level 1983-93, in the carbonate rocks in part of East Whiteland and Charlestown Townships, Chester County, Pennsylvania, by B.C. McManus and R.A. Sloto.
- OFR 94-87.** Ground-water resources data for Warren County, Pennsylvania, by M.E. Moore and T.F. Buckwalter.
- OFR 94-381.** Hydrologic data for northern Bucks County, Pennsylvania, by C.L. Schreffler, B.C. McManus, and C.J. Rowland-Lesitsky.
- OFR 94-510.** Use of stable isotopes of carbon, nitrogen, and sulfur to identify sources of nitrogen in surface waters in the Lower Susquehanna River Basin, Pennsylvania, by C.A. Cravotta, III. [THIS REPORT ALSO WAS APPROVED FOR PUBLICATION AS A USGS WATER-SUPPLY PAPER.]
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